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10/613,825	07/02/2003	Robert W. Boesel	COM0201#2 (038,0448)	3912
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EXAMINER DEPPE, BETSY LEE				
ART UNIT 2611		PAPER NUMBER		
NOTIFICATION DATE 06/04/2009		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary

Application No.

10/613,825

Applicant(s)

BOESEL ET AL.

Examiner

Betsy L. Deppe

Art Unit

2611

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/09/08 - 4/10/09.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1.5-7.9, 10, 12, 13, 15-18, 26-28 and 34-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1.5-7.9, 10, 12, 13, 15-18, 26-28 and 34-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12/09/08; 3/10/09; 4/15/09
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings were received on March 3, 2009. These drawings are acceptable.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on December 9, 2008; March 10, 2009; and April 15, 2009 have been considered by the examiner. An initialed copy of each IDS is included with this Office Action.

Claim Objections

3. The claims are objected to because of the following informalities:
 - a. in claim 1, line 16, "into the symbol estimate" should be "to determine the symbol estimate";
 - b. in claim 6, line 3, "in" should be "into";
 - c. in claim 6, line 7, the Examiner suggests changing "operating on" to "processing";
 - d. in claim 15, line 7, the Examiner suggests changing "operating on" to "processing."Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 5, 6, and 34-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

7. With regard to claim 1, 36 and 37, the specification, as originally filed, does not appear to describe selecting a set of relevant multi-paths "based on instantaneous powers of the plurality of channel estimates" (see claim 1, lines 8-9; claim 36, line 2 and claim 37, lines 10-12). Paragraph [0065] describes path selection based on channel estimates and a "strongest instantaneous multi-path component" but does not describe "instantaneous power *of channel estimates*" (*emphasis added*) as recited.

8. Dependent claim(s) are rejected under the same ground(s) as the claim(s) from which it depends.

9. Claims 1, 5, 6, 13 and 34-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

10. With regard to claims 1, 36 and 37, the specification does not appear to describe selecting a set of relevant multi-paths "based on instantaneous powers of the plurality of channel estimates" (see claim 1, lines 8-9; claim 36, line 2 and claim 37, lines 10-12).

Paragraph [0065] describes path selection based on channel estimates and a "strongest instantaneous multi-path component" but does not describe "instantaneous power of channel estimates" as recited.

11. With regard to claim 13, the specification does not appear to describe the processor recited in claim 7 in combination with the processor recited in claim 13. The processor recited in claim 7 corresponds to Figure 7 whereas the processor recited in claim 13 corresponds to Figure 16. The detailed description of Figure 16 (see paragraph [0080]) does not describe how the processor is used in combination with that in Figure 7.

12. Dependent claim(s) are rejected under the same ground(s) as the claim(s) from which it depends.

13. Claims 1, 5-7, 9, 10, 12, 13, 15-18, 26-28, and 34-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

14. With regard to claims 1 and 37, it is unclear what is meant by "serially determining a channel estimate" as recited in claim 1, line 6 and claim 37, line 8.

15. With regard to claims 1 and 37, it is unclear from "to determine a symbol estimate stored in a second memory element" on lines 10-11 and lines 13-14, respectively, whether the iterative process determines symbol estimate which is then stored in a

memory element or whether the iterative process determines a symbol estimate that has been stored in a memory element.

16. With regard to claim 5, it is unclear how the performing step relates to the steps recited in claim 1. Based on the detailed description, it appears that the performing step in claim 5 encompasses or is a broader recitation of the steps in claim 1, lines 6-16.

17. With regard to claim 6, it is unclear how the performing step on lines 6-8 relates to the steps recited in claim 1.

18. With regard to claim 7, it is unclear from line 17 which results are accumulated "into a symbol buffer." For example, are "results" referring to the plurality of extracted multi-path components that are produced or the result of the multiply step?

19. With regards to claim 15-18, it is unclear how the means recited in the respective dependent claims interface with or relate to the "plurality of buffers" and the "processor" recited in claim 7 since the limitations in claim 7 process "chip samples" whereas claims 15-17 involve "digital samples." For example, how does the "means for buffering" or "first memory element" in claim 15 differ the "plurality of buffers" in claim 7.

20. With regard to claims 34 and 38, "an instantaneous power that is greater than a threshold below the strongest instantaneous power" (*emphasis added*) is confusing. It is unclear which multi-paths should be excluded from the set. If the threshold is "below" the strongest instantaneous power, is the multi-path having the "strongest instantaneous power" excluded since it is "greater than" the threshold?

21. With regard to claim 36, it is unclear what is meant by "to serially determine a channel estimate" on line 1.

22. Dependent claim(s) are rejected under the same ground(s) as the claim(s) from which it depends.

Claim Rejections - 35 USC § 103

23. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

24. Claims 7, 9, 10, 12, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. (US Patent No. 7,035,318 B2 cited in the Office Action mailed September 28, 2007) in view of Schlem et al. (US Pub. No. 2003/0235238 A1 cited in the Office Action mailed September 28, 2007) and Nguyen et al. (US Patent No. 6,356,581).

25. With regard to claim 7, Taniguchi et al. discloses the claimed invention including a plurality of buffers (52) and a processor (54), coupled to the plurality of buffers, adapted to perform an iterative process of serially extracting a multi-path component and accumulating results into a symbol buffer. (See abstract; Figures 2-4; column 5, lines 42-46; column 6, lines 35-54; column 8, lines 33-44; and column 10, lines 39-62) However, Taniguchi et al. does not teach multiplying the plurality of extracted multi-path components with a plurality of channel estimates. Furthermore, Taniguchi et al. does not disclose transitioning into a sleep mode as recited in claim 7, lines 19-22.

Figure 2 of Schlem et al. discloses multiplying the plurality of extracted multi-path components with a plurality of channel estimates in order to optimize data recovery. (See paragraphs [0055]-[0056]) It would have been obvious to one of ordinary skill in

the art at the time the invention was made to combine the teachings of Schlem et al. and Taniguchi in order to improve data recovery by compensating for channel conditions that affect the quality of the received signal.

However, Taniguchi et al. in view of Schlem et al. does not disclose transitioning into a sleep mode. Nguyen et al. teaches the desirability of placing a processor of a CDMA receiver in sleep mode when there is no new data in a buffer to process. (See column 2, lines 4-21 and column 7, lines 21-26) It would have been obvious to one of ordinary skill in the art at the time the invention was made to transition the processor in Taniguchi et al. in view of Schlem et al. into a sleep mode after processing the first block of samples and transitioning the processor into a processing mode after new samples are available in order to conserve power and extend the battery life of the receiver.

26. With regard to claim 9, Taniguchi et al. in view of Schlem et al. and Nguyen et al. discloses the claimed invention including three physically separate buffers. However, Taniguchi et al. in view of Schlem et al. and Nguyen et al. does not disclose that one buffer is for receiving data and that two buffers is for random access by correlator. It would have been an obvious matter of design choice to one of ordinary skill in the art at the time the invention was made to designate the number of buffers for receiving data and for random access by the correlator based on the rate at which data is being stored and read for processing. The number of buffers allocated for writing to and reading from does not affect the functionality of the overall circuit.

27. With regard to claim 10, Taniguchi et al. in view of Schlem et al. and Nguyen et al. discloses the claimed invention except for five separate buffers as recited. It would

have been an obvious matter of design choice to one of ordinary skill in the art at the time the invention was made to determine the number of buffers to use with a given number of the buffers designated for receiving data and for random access by the correlator based on the rate at which data is being stored and read for processing. The number of buffers and the specific allocation of these buffers for writing to and reading from do not affect the functionality of the overall circuit.

28. With regard to claim 12, Taniguchi et al. in view of Schlem et al. and Nguyen et al. discloses the claimed invention including performing searches by correlating the multi-path components. (See Taniguchi et al., column 6, lines 46-49)

29. With regard to claims 26 and 27, Taniguchi et al. in view of Schlem et al. and Nguyen et al. discloses the claimed invention including using a pilot symbol to determine the channel estimate. (See Schlem et al., paragraph [0055]) However, Taniguchi et al. in view of Schlem et al. does not disclose whether the pilot signal is a burst-pilot signal or a continuous-pilot signal. It would have been an obvious matter of design choice to implement the circuit in a system that used a burst-pilot signal or a continuous-pilot signal since the type of pilot signal itself does not affect the operation or functionality of the apparatus. Furthermore, the applicant has not disclosed that using a particular type of pilot signal provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art would have expected applicant's invention to perform equally well with either type of pilot signal.

30. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. in view of Schlem et al. and Nguyen et al. as applied to claim 7

above, and further in view of Butler et al. (US Patent No. 6,748,010 B1 cited in the Office Action mailed September 28, 2007).

31. With regard to claim 15, Taniguchi et al. in view of Schlem et al. and Nguyen et al. discloses the claimed invention except for tuning to a non-original RF frequency, buffering digital samples while tuned at the non-original RF frequency, retuning the RF frequency to the original frequency, and performing search and channel estimation while operating on the digital samples of the original frequency.

Since Butler et al. discloses that CDMA communication systems use a pilot channel and a data/traffic channel (i.e. channels with different frequencies), it would have been obvious to one of ordinary skill in the art at the time the invention was made to tune or retune the receiver in Taniguchi et al. in view of Schlem et al. to the appropriate frequencies for receiving the pilot signal and data in order to accurately recover the transmitted data. Regardless of which frequency the receiver is tuned, the receiver buffers the digital samples. Furthermore, it is known in the art that a pilot signal is commonly used for performing searching and channel estimation.

32. With regard to claim 16, Taniguchi et al. in view of Schlem et al., Nguyen et al. and Butler et al. discloses the claimed invention since it would have been obvious to one of ordinary skill in the art at the time the invention was made for the buffering means maintain the digital samples from the non-original RF frequency in order to save the digital samples for subsequent processing if necessary.

33. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. in view of Schlem et al. and Nguyen et al. as applied to claim 7 above,

and further in view of Easton et al. (US Patent No. 6,985,516 cited in the Office Action mailed April 17, 2007). Taniguchi et al. in view of Schlem et al. and Nguyen et al. discloses the claimed invention except for means for processing a plurality of sets of digital samples from a plurality of distinct receiver RF chains.

Easton et al. discloses a receiver that stores a plurality of sets of digital samples from a plurality of distinct receiver RF chains in a buffer. (See column 6, line 36-39) It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Easton with the teachings of Taniguchi et al. in view of Schlem et al. and Nguyen et al. in order to improve data recovery by using diversity (via a plurality of distinct receiver chains) in the receiver.

34. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. in view of Schlem et al. and Nguyen et al. as applied to claim 7 above, and further in view of Subrahmanya et al. (US Pub. No. 2003/0128678 A1 cited in the Office Action mailed September 28, 2007). Taniguchi et al. in view of Schlem et al. and Nguyen et al. discloses the claimed invention including a receiver that processes multi-path components. (See Taniguchi et al., column 1, lines 7-12).

Since Subrahmanya et al. teaches using transmit diversity in a CDMA system (see paragraph [0006]), it would have been an obvious matter of design choice to apply the receiver of Taniguchi et al. in view of Schlem et al. to a system with transmitter diversity in order to further combat the effects of multi-path components. Since the receiver of Taniguchi et al. in view of Schlem et al. inherently processes signals having a plurality of multi-path components (see Taniguchi et al., column 1, lines 7-12), the

source or cause of the multi-path components (e.g. via transmitter diversity) does not affect the operation or functionality of the disclosed receiver.

35. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taniguchi et al. in view of Schlem et al. and Nguyen et al., as applied to claim 7, and further in view of Subrahmanya et al. and Easton et al. Taniguchi et al. in view of Schlem et al. and Nguyen et al. discloses the claimed invention except that the digital signals stored in the first memory buffer are not communicated in a multiple transmit, multiple receive antenna scheme.

Since Subrahmanya et al. teaches using transmit diversity in a CDMA system (see paragraph [0006]), it would have been an obvious matter of design choice to apply the receiver of Taniguchi et al. in view of Schlem et al. and Nguyen et al. to a system with a multiple transmit antenna scheme in order to further combat the effects of multi-path components. Furthermore, since the receiver of Taniguchi et al. in view of Schlem et al. and Nguyen et al. inherently processes signals having a plurality of multi-path components (see Taniguchi et al., column 1, lines 7-12), the source or cause of the multi-path components (e.g. via transmitter diversity) does not affect the operation or functionality of the disclosed receiver.

Since Easton et al. teaches applying a multiple receiver antenna scheme to a CDMA receiver (see column 6, line 36-39), it would have been obvious to one of ordinary skill in the art at the time the invention was made to also apply a multiple receiver antenna scheme to the receiver disclosed by Taniguchi et al. in view of Schlem

et al., Nguyen et al. and Subrahmanya et al. in order to improve data recovery by also using diversity in the receiver.

Conclusion

36. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Betsy L. Deppe whose telephone number is (571) 272-3054. The examiner can normally be reached on Monday, Wednesday and Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Betsy L. Deppe/
Primary Examiner, Art Unit 2611